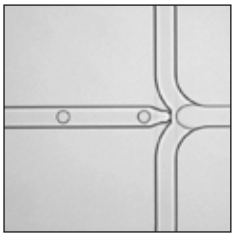
micronit

MICROFLUIDICS

MICROFLUIDIC RESEARCH PRODUCTS



Contents

Fluidic Connect 3

Fluidic Connect PRO Chipholder 4
Inserts 4
Connection Kits 5
Filters 5
Replacement Kits 5

Fluidic Connect 4515 Chipholder 6
Connection Kits 7
Replacement Kits 7

Fluidic Chips 8

Droplet Generator Chips 8
Microreactor Chips 9
Micromixer Chips 10
Flowcells 10
Cross Channel Chips 11

Polymer Chips 12

Polycarbonate Microreactor Chips 12
Cyclic Olefin Copolymer Microreactor Chips 13

Custom Chips 14

Fluidic PRO - Your Custom Chip 14
Application Example - Rock Pore Structure Simulation Chips 15

Microreactors 16

Milliliter Reactor 16
Microreactor 1507 16
Connection Frame 1507 17
Connection Kits 1507 17

MF Starker Kit 18

MF Starter Kit 18

FLUIDIC CONNECT

A USER-FRIENDLY LAB-ON-A-CHIP PLATFORM

The lab-on-a-chip platform Fluidic Connect offers a user-friendly way of creating your own lab-on-a-chip setup within minutes of time. The microfluidic chips within the platform enable micro reaction, cell analysis, droplet generation and many more. The chipholders are durable and robust and compatible with standard laboratory equipment such as syringe pumps and upright and inverted microscopes.

Use Fluidic Connect for your lab-on-a-chip experiments and reduce your time to obtain results!

Key features of Fluidic Connect:

- User-friendly, leak-free connections
- Chemically inert materials
- Large chip viewing area
- Compatible with upright and inverse microscopes
- Building block in a modular system
- Standard and custom chips available

	Fluidic Connect PRO	Fluidic Connect 4515
Chipholders		
Sealing Mechanism	Load 'n Seal	Slide 'n Connect
Chipholder Material	Aluminium	Stainless Steel
Dimensions (L, W, H)	128 x 85,4 x 20 mm	80 x 55 x 9.5 mm
Max. Operating Temperature	80ºC	80ºC (Teflon), 50ºC (Fused Silica)
Max. Operating Pressure	**10 bar**	**100 bar**
Sealing Material	Perlast (FFKM)	PEEK, FEP
Compatible Chip Thickness	1.1 – 2.0 mm	1.1 – 2.0 mm
Compatible Chip Sizes	15 x 15 mm 15 x 30 mm 15 x 45 mm 15 x 60 mm 15 x 90 mm 30 x 30 mm 30 x 45 mm 30 x 60 mm 30 x 90 mm 25 x 75 mm*	15 x 45 mm
Compatible Tubing	1/16 inch OD Teflon, Stainless Steel, PEEK	1/16 inch OD Teflon, Stainless Steel, PEEK , 375 µm OD Fused Silica

**) Microscope Slide Format*

FLUIDIC CONNECT PRO CHIPHOLDER

The Load 'n Seal design assures tight connections without the possibility of breaking precious microfluidic chips. By cleverly making use of inserts the holder can easily be adapted to chips of different sizes and thicknesses. It is even capable of connecting multiple chips at once.

Special Features:

- Fast, easy and robust fluidic connections
- Future proof thanks to replaceable inserts
- Holder defined sealing to prevent chip cracking
- Simultaneous connection of multiple chips
- Large chip viewing area possible
- Compatible with upright and inverted microscopes
- Able to connect chips from 15 x 15 mm up to 30 x 90 mm

Description	Additional Information	Product Code	Price €
Fluidic Connect PRO Chipholder incl. inserts for Standard 15 x 45 mm Micronit Chips	Chipholder including inserts for Micronit Standard Chips	FC_PRO_CH4515	**1245**
Fluidic Connect PRO Chipholder Frame	(excluding inserts)	FC_PRO_CH	**995**
Custom Fluidic Connect PRO Chipholder	Custom Colour and Engraved Logo (excluding inserts)	FC_PRO_CH_C	**1250**

Inserts

for Fluidic Connect PRO Chipholder

Description	Additional Information	Product Code	Price €
Fluidic PRO 4515 Inserts for standard 15 x 45 mm Micronit chips in polymer cartridge	1 x top insert + 1 x bottom insert + adaptors for thin bottom chips	FC_PRO_IN_4515	**250**
Fluidic PRO 1515 Inserts for 15 x 15 mm sized chips (without cartridge)	1 x top insert + 1 x bottom insert + adaptors for thin bottom chips	FC_PRO_IN_1515	**250**
Fluidic PRO 15 Inserts for 15 mm wide chips	2 x top insert + 2 x bottom insert + adaptors for thin bottom chips	FC_PRO_IN_15	**250**

Inserts

for Fluidic Connect PRO Chipholder

Description	Additional Information	Product Code	Price €
Fluidic PRO 30 Inserts for 30 mm wide chips	2 x top insert + 2 x bottom insert + adaptors for thin bottom chips	FC_PRO_IN_30	**250**
Fluidic PRO 7525 Inserts for microscope slides	1 x top insert + 1 x bottom insert	FC_PRO_IN_7525	**250**
Fluidic PRO Custom Inserts for chips from 15 x 15 mm to 30 x 90 mm	Custom made inserts, top and bottom set	FC_PRO_IN_C	**475**

Connection Kits

for Fluidic Connect PRO Chipholder

Description	Additional Information	Product Code	Price €
Teflon Connection Kit contains five meter capillaries (1/16" OD, 250 µm ID), five nuts	Resistant to high temperatures, chemically resistant, ideal for low friction requirements	FC_PRO_TF_KIT	**135**
Tubing to Pump Connection Kit contains luer-lock adaptors and unions for 1/16 inch tubing	Connects the tubing to your pump or other tubing	FC_CO_KIT	**95**

Filters

for Fluidic Connect PRO chipholder

Description	Additional Information	Product Code	Price €
Set of 2 in-line filters material: PEEK, 2 µm porosity	contains 4 connectors placement between PTFE tubing with a 1/16" OD	FC_FILTERS	**115**

Replacement Kits

for Fluidic Connect PRO chipholder

Description	Additional Information	Product Code	Price €
Pack of 5 FFKM (Perlast) perfluoroelastomer nuts	Re-usable, excellent chemical resistance, excellent steam resistance, high temperature resistance, FDA, USP Class VI and 3A compliant	FC_PRO_FFKM_KIT.05	**95**
Pack of 10 FFKM (Perlast) perfluoroelastomer nuts		FC_PRO_FFKM_KIT.10	**150**

FLUIDIC CONNECT 4515 CHIPHOLDER

The basic tool for lab-on-a-chip experiments. Fluidic Connect 4515 is a user-friendly chipholder providing leak-free fluidic connections. It enables to work safely with high pressure (up to 100 bar / 1450 psi). Includes inverter frame, for use on upright microscopes, and user manual.

Special Features:

- Easy chip handling thanks to polymer cartridge
- High pressure connections
- Low dead-volume connections
- Electrical connections
- Compatible with all standard Fluidic Chips
- Compatible Fluidic PRO 45 x 15 mm custom chips

Description	Additional Information	Product Code	Price €
Fluidic Connect 4515 Chipholder		FC_FC4515	**975**

Chip holder selection

In the following cases Micronit advises to use the Fluidic Connect 4515 holder instead of the Fluidic Connect PRO holder.

- Fluidic pressures above 10 bar
- With Fused Silica capillaries (need for minimal dead volume)
- With Stainless steel tubing
- When a smaller footprint is necessary

Connection Kits

for Fluidic Connect 4515 Chipholder

Description	Additional Information	Product Code	Price €
Teflon Connection Kit; Contains five meter capillaries (1/16" OD, 250 µm ID), five ferrules and nuts	Resistant to high temperatures, chemically resistant, ideal for low friction requirements	FC_TF_KIT	**135**
Fused Silica Connection Kit; Contains five meter capillaries (375µm OD, 150 µm ID), five ferrules and nuts	Ideal for low dead volume (20-90 nl) connections and thin bottom chips. Chemically resistance	FC_FS_KIT	**285**
Stainless Steel Connection Kit; contains five pieces of 50 cm tubing (1/16" OD, 250 µm ID), five ferrules and nuts	Ideal for high pressure experiments where a solid connection is required	FC_SS_KIT	**175**
Electrical Connection Kit; contains five cables with a nut and probe (OD=0.76 mm) with banana plug connector. Maximum voltage 30V (DC), and 60V (AC)	Makes easy connections to on-chip electrodes	FC_EL_KIT	**155**
Tubing to Pump Connection Kit; contains luer-lock adaptors and unions for 375 µm OD fused silica, 1/16 inch teflon of stainless steel tubing	Connects the tubing to your pump or other tubing	FC_CO_KIT	**95**

Replacement Kits

for Fluidic Connect 4515 chipholder

Description	Additional Information	Product Code	Price €
5 Nanoport Nuts and Ferrules	Compatible with the FC_FS_KIT	FC_NP_KIT	**195**
5 Flat-bottom Nuts and Ferrules	Compatible with the FC_TF_KIT and FC_SS_KIT	FC_FB_KIT	**95**

micronit MICROFLUIDICS

FLUIDIC CHIPS

All the chips are made of borosilicate glass and are delivered in a polymer (PP) cartridge of 75 x 25 mm which is compatible with the Fluidic Connect 4515 chipholder and the Fluidic Connect PRO chipholder.

DROPLET GENERATOR CHIPS

Microfluidic droplet generators are excellent tools for generating highly reproducible microsized droplets with much higher precision and repeatability compared to conventional methods. Two designs are available; a focussed flow and a T-shaped design. Typical droplet sizes are 10-70 micrometer in diameter.
Uncoated droplet generators are suitable for making oil-in-water droplets. The hydrophobic coated droplet generators are suitable for making water-in-oil droplets.

T-Shaped
Droplet Generator

Focussed Flow
Droplet Generator

Description	Product Code	Price €
Focussed Flow Droplet Generators (small droplets) Channel Width: 100 µm Channel Depth: 20 µm Droplet Size: 10-50 µm	FC_FFDG.2_PACK	**117** Pack of 3 Chips
Focussed Flow Droplet Generators (large droplets) Channel Width: 500 µm Channel Depth: 100 µm Droplet Size: 50-100 µm	FC_FFDG.2.50_PACK	**117** Pack of 3 Chips
T-Shaped Droplet Generators Channel Width: 100 µm Channel Depth: 20 µm Droplet Size: 10-50 µm	FC_TSDG.2 _PACK	**117** Pack of 3 Chips
Hydrophobic Coating E.g. for water-in-oil droplets	FC_COATING	**30** per chip

Do you want different features for your droplet generators?

Please ask us to have your own custom made droplet generator, e.g.

- With more inlets or outlets
- With different channel parameters
- With integrated electrodes
- In Fused Silica / Quarz glass

MICROREACTOR CHIPS

Micronit offers different standard microreactor configurations. The microreactor chips have two inlets and one outlet. Two fluids can be injected separately and will mix by diffusion, without turbulence. The chemical reaction time of the fluids is determined by the pressure or the channel length. The FC_R50.332.3 has a thin 145 micrometer bottom plate making it suitable for confocal microscopy.

Description	Product Code	Price €
Powderblasted Microreactor Chips (6 Microliter) Channel length: 330 mm (meander, 2 inlets, 1 outlet) Channel width: 150 µm Channel depth: 150 µm Internal Volume: 6 µl	FC_R150.332.2_PACK	**117** Pack of 3 Chips
Powderblasted Microreactor Chips (13 Microliter) Channel length: 760 mm (meander, 2 inlets, 1 outlet) Channel width: 150 µm Channel depth: 150 µm Internal Volume: 13 µl	FC_R150.676.2_PACK	**117** Pack of 3 Chips
Thin Bottom Microreactor Chips* Channel length: 330 mm (meander, 2 inlets, 1 outlet) Channel width: 50 µm Channel depth: 20 µm Internal Volume: 0.3 µl	FC_R50.332.3_PACK	**117** Pack of 3 Chips
Microreactors (0.3 Microliter) Channel length: 330 mm (meander, 2 inlets, 1 outlet) Channel width: 50 µm Channel depth: 20 µm Internal Volume: 0.3 µl	FC_R50.332.2_PACK	**117** Pack of 3 Chips
H-Microreactor (2 inlets, 2 outlets) Channel length: 15 mm (straight channel, 2 inlets, 2 outlets) Channel width: 150 µm Channel depth: 150 µm Internal Volume: 1.25 µl	FC_H150.015.2_PACK	**117** Pack of 3 Chips
Hydrophobic Coating	FC_COATING	**30** per chip

*) If you use the Fluidic Connect 4515 Chipholder it is recommended to use fused silica connections (FC_FS_KIT) with nanoport ferrules in combination with the thin bottom chips.

MICROMIXER CHIPS

Triple layer chips offering very short mixing times, ideally mixed conditions and efficient mixing even at low pressures. The structures are Powderblasted.
Use the tear-drop mixer for mixing of fluids with low Reynolds numbers (Re<100) and the swirl mixer for high Reynolds numbers (Re>50).

Teardrop Micromixer

Swirl Micromixer

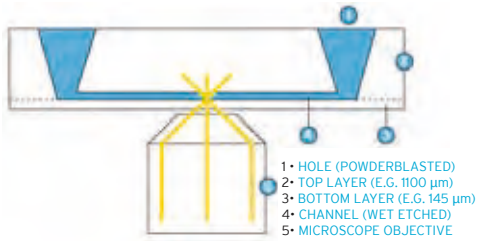
Description	Product Code	Price €
Teardrop Micromixers Channel Width: 200 µm Channel depth: 150 µm Internal Volume: 2 µl	FC_TD26_PACK	**330** Pack of 2 Chips
Swirl Micromixer Channel Width: 200 µm Channel depth: 150 µm Internal Volume: 1 µm	FC_SW11_PACK	**330** Pack of 2 Chips

FLOWCELLS

These thin bottom flowcells are ideal for experiments such as cell, particle or DNA imaging. One chip contains 3 flow cells of different widths.
The thin 145 micrometer bottom plate of the FC_FLC50.3 makes it suitable for confocal microscopy.

Description	Product Code	Price €
Thin Bottom Flow Cell Channel Widths: 500 µm, 1000 µm, 1500 µm Channel Depth: 50 µm Internal Volume: 1.0 µl, 1.9 µl, 2.9 µl	FC_FLC50.3_PACK	**117** Pack of 3 Chips
Hydrophobic Coating	FC_COATING	**30** per chip

If you use the Fluidic Connect 4515 Chipholder it is recommended to use fused silica connections (FC_FS_KIT) with nanoport ferrules in combination with the thin bottom chips.



CROSS CHANNEL CHIPS

Microfluidic chips with two channels crossing each other. Also suitable for focused flow applications or droplet generation as well as capillary electrophoresis.
The FC_X3550CH.3 has a thin 145 micrometer bottom plate making it suitable for confocal microscopy.

Description	Product Code	Price €
Cross Channel Chips Channel Width: 50 µm Channel Depth: 20 µm Internal Volume: 0.1 µl	FC_X3550CH.2_PACK	**117** Pack of 3 Chips
Cross Channel Chips (Thin Bottom)* Channel Width: 50 µm Channel Depth: 20 µm Internal Volume: 0.1 µl	FC_X3550CH.3_PACK	**237** Pack of 3 Chips
Hydrophobic Coating	FC_COATING	**30** per chip

*) If you use the Fluidic Connect 4515 Chipholder it is recommended to use fused silica connections (FC_FS_KIT) with nanoport ferrules in combination with the thin bottom chips.

POLYCARBONATE MICROREACTOR CHIPS

Micronit offers three types standard microreactor configurations in Polycarbonate. The microreactor chips have two inlets and one outlet. Two fluids can be injected separately and will mix by diffusion, without turbulence. The chemical reaction time of the fluids is determined by the pressure or the channel length.

Description	Product Code	Price €
Polycarbonate Microreactor Chips (6 Microliter) Channel length: 332 mm (meander, 2 inlets, 1 outlet) Channel width: 150 µm Channel depth: 110 µm Internal Volume: 6 µl	FC_R150.332.2_PC_PACK	**117** Pack of 3 Chips
Polycarbonate Microreactor Chips (13 Microliter) Channel length: 760 mm (meander, 2 inlets, 1 outlet) Channel width: 150 µm Channel depth: 110 µm Internal Volume: 13 µl	FC_R150.676.2_PC_PACK	**117** Pack of 3 Chips
H-Microreactor (2 inlets, 2 outlets) Channel length: 15 mm (straight channel, 2 inlets, 2 outlets) Channel width: 150 µm Channel depth: 110 µm Internal Volume: 1.25 µl	FC_H150.015.2_PC_PACK	**117** Pack of 3 Chips

CYCLIC OLEFIN COPOLYMER MICROREACTOR CHIPS

Micronit offers three types standard microreactor configurations in Cyclic Olefin Copolymer. The micro reactor chips have two inlets and one outlet. Two fluids can be injected separately and will mix by diffusion, without turbulence. The chemical reaction time of the fluids is determined by the pressure or the channel length.

Description	Product Code	Price €
Cyclic Olefin Copolymer Microreactor Chips (6 Microliter) Channel length: 332 mm (meander, 2 inlets, 1 outlet) Channel width: 150 µm Channel depth: 110 µm Internal Volume: 6 µl	FC_R150.332.2_COC_PACK	**117** Pack of 3 Chips
Cyclic Olefin Copolymer Microreactor Chips (13 Microliter) Channel length: 760 mm (meander, 2 inlets, 1 outlet) Channel width: 150 µm Channel depth: 110 µm Internal Volume: 13 µl	FC_R150.676.2_COC_PACK	**117** Pack of 3 Chips
H-Microreactor (2 inlets, 2 outlets) Channel length: 15 mm (straight channel, 2 inlets, 2 outlets) Channel width: 150 µm Channel depth: 110 µm Internal Volume: 1.25 µl	FC_H150.015.2_COC_PACK	**117** Pack of 3 Chips

micronit MICROFLUIDICS

FLUIDIC PRO - YOUR CUSTOM CHIP

Micronit Microfluidics BV does not only offer standard products, but also customized microfluidic chips. An affordable way of ordering custom chips compatible with your Fluidic Connect PRO chipholder is to have them developed according to the Fluidic PRO prototyping service. A few design guidelines will reduce the cost and speed up the delivery time.

The Fluidic PRO prototyping service allows your microfluidic designs to be manufactured in a class 100 cleanroom by professionals. Fluidic PRO enables you to stay focussed on your research. It saves you time both in design and lab hours, speeds up your research, makes you more productive and allows you to publish sooner.

Fluidic PRO offers maximum freedom through a wide range of possibilities.

- Customized designs
- Glass or fused silica
- Wide range of channel depths and widths
- Thick- or thin-bottom chips, suitable for confocal microscopy
- Integrated electrodes (Pt, Au, ...)
- Up to 4 different designs per batch
- Small batches starting with only 12 chips

With more than a decade of experience in microfluidic chip manufacturing for science and industry, Micronit is the perfect partner to outsource your microfluidic chip needs.

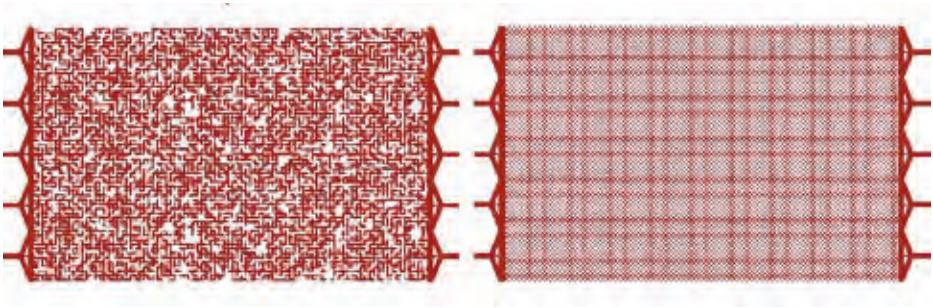
Standard options include:
- Single depth etched
- Single depth etched with thin bottom
- Single depth etched with electrodes
- Double depth etched
- Fused silica single depth etched
- Single depth powderblasted

How to proceed?
- **Make up to 4 different designs** of a desired channel layout. These can be presented as CAD designs but simple sketches or just wording is also fine.
- **Contact the Micronit sales team** to discuss your requirements and receive a quotation.
- After you have placed the order our microfluidics design experts will transform your designs to CAD designs. We will send the designs back to you for a final check, and after your approval we will start processing.
- **After 4 to 5 weeks**, you will receive your chips and you can start your research.

APPLICATION EXAMPLE - ROCK PORE STRUCTURE SIMULATION CHIPS

Micronit also has yearlong experience in making micro models for pore structure research, e.g. for the oil and petrol industries and research. Random patterns and uniform patterns are possible.

- Pore dimensions from 10 µm to 1mm to simulate multiple types of rock like sandstone, limestone, basalt and others
- Pores in glass for perfect optical access
- Monitoring surfactants, gases, oil and aqueous streams through pores
- Solid glass for high pressure (1500psi) and high temperature (100°C)
- Options to go even higher



Please ask our experts to have your custom chips made.

MICROREACTORS

MILLILITER REACTOR

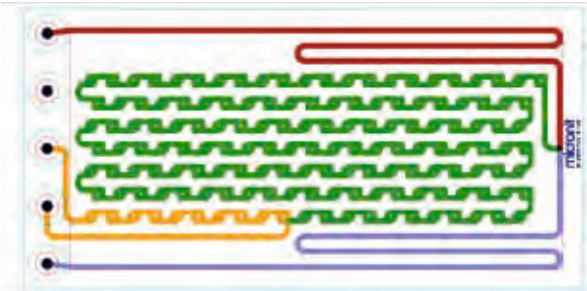
Microreactor technology (MRT) or flowchemistry is an upcoming technology in the pharmaceutical industry and fine-chemistry. The excellent mass- and heat-transfer properties of microreactors give this technology many advantages over batchwise chemistry:

- Higher yield and selectivity
- Inherently safer processes
- Straight forward scaling-up
- Continuous production possible
- Improved reactor control
- Enables new chemistry

MICROREACTOR 1507

The Microreactor 1507 features two inlets for reagents and one for a quench. When the quench is not in use it can be blocked. Static split and recombine structures facilitate mixing at low Reynolds numbers creating almost instant mixing and excellent heat and mass transfer.

Description	Operating Pressure (bar)	Internal Volume (ml)	Channel Width (mm)	Channel Depth (mm)	Product Code	Price €
Microreactor 1507	10	2.4	1.5	1.1	MR_1507.4_MXQ_01	**1500**



CONNECTION FRAME 1507

The connection frame 1507 is compatible with microreactors of 15 cm x 7 cm. The connection block is made of high grade durable stainless steel to prevent corrosion. The aluminium frame protects the glass reactor during use in the lab. It can easily be connected to peripheral equipment such as HPLC pumps or syringe pumps with Connection Kit 1507.

Operating range (pressure)	0 – 10 bar / 0 – 145 psi
Maximum working temperature	max 80 ºC (teflon connections)
Dimensions	15 x 7.5 x 2 cm
Material	connection block: Stainless steel frame: Aluminium

Description	Product Code	Price €
Connection Frame 1507 Chipholder for easy connection of the Microreactor 1507	MR_FRAME_1507	**995**

CONNECTION KITS 1507

Contains five meter teflon tubing (1/4" – 28 UNF), five ferrules, and five nuts. The force necessary to tighten the fittings is regulated by the nuts themselves this prevents over tightening.

Description	Product Code	Price €
Connection Kit (1507) Tubing, Ferrules and Nuts	MR_KIT_TF	**150**

MF STARTER KIT

If you are looking for an all-in-one solution to start your research or you want to do your first steps in microfluidics or need a initial setup for the first steps in your microfluidic product development. Micronit's Microfluidic Starter Kit is your solution.

The Microlfuidic Starter Kit includes:

- Microfluidic chips
- Fluidic Connect PRO Chipholder
- Syringe pumps
- Accessories

Microfluidic chips

A selection of three microfluidic chips: droplet generator, micromixer chip and a microreactor chip. You can choose the chips from the pages 8, 9 and 10 in this brochure.

Fluidic Connect PRO Chipholder

The Load 'n Seal design assures tight connections without the possibility of breaking precious microfluidic chips. By cleverly making use of inserts the holder can easily be adapted to chips of different sizes and thicknesses. It is even capable of connecting multiple chips at once.

Special Features:

- Fast, easy and robust fluidic connections
- Future proof thanks to replaceable inserts
- Holder defined sealing to prevent chip cracking
- Simultaneous connection of multiple chips
- Large chip viewing area possible
- Compatible with upright and inverted microscopes
- Able to connect chips from 15 x 15 mm up to 30 x 90 mm

Syringe Pumps

2 x NE-300 Syringe pumps. These are easy-to-use infusion pumps with a broad range of flow rates for your microfluidic applications.

Accessories

Everything you need for starting and running your own microfluidic system

Description	Product Code	Price €
MF Starter Kit	MF_STARTER_KIT	**4750**

micronit
MICROFLUIDICS

Product Development

Design

Prototyping

Manufacturing

Address	Colosseum 15 7521 PV Enschede The Netherlands
Phone	+31 53 850 6 850
Fax	+31 53 850 6 851
E-mail	info@micronit.com
Website	www.micronit.com
Webstore	store.micronit.com

© Micronit Microfluidics 2014